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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,603	02/22/2002	Ming Yan	LWM-A078	5733
24113	7590	03/01/2006	EXAMINER	
PATTERSON, THUENTE, SKAAR & CHRISTENSEN, P.A. 4800 IDS CENTER 80 SOUTH 8TH STREET MINNEAPOLIS, MN 55402-2100			PAK, SUNG H	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 03/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

A

Office Action Summary	Application No. 10/082,603	Applicant(s) YAN ET AL.	
	Examiner Sung H. Pak	Art Unit 2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/20/2005 has been entered.

Response to Amendment

Claims 1-20 are pending. All pending claims have been carefully reconsidered in view of the amendment and arguments for patentability provided in the applicants' response filed 7/20/2005. After carefully reconsideration, the claims remain rejected over the prior art of record. Please refer to Response to Arguments for detail.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicants are advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2, 4, 6-10, 12, 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al (US 5,940,548) in view of Chen et al (US 6,356,681).

Yamada reference discloses a method of optimizing a filter response of an arrayed waveguide grating with all the limitations set forth in the claims, except it does not explicitly teach the optical path length of the waveguides being controlled to within ten nanometers.

Specifically, Yamada disclose the steps of: measuring a respective phase error of a plurality of waveguide cores of an arrayed waveguide grating using a low coherent light interferometry (column 14 lines 34-41); adjusting a respective optical path length of the cores in accordance with the respective phase error of the cores by adjusting a respective refractive index of the cores, thereby optimizing a filter response of the arrayed waveguide grating (column 14 lines 42-44);

wherein the respective refractive index is adjusted by using laser energy (column 14 lines 42-44);

wherein the adjusting of the refractive index of the cores is used to equalize channel power of the arrayed waveguide grating (column 14 lines 34-44: specifically lines 34-44 states, inter alia, “measure... the distribution of amplitude errors... Based on these measurements, determine the amount of amplitude adjustment...”);

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wherein the adjusting of the refractive index of the cores is used to compensate for dispersion within the arrayed waveguide grating (column 14 lines 34-44: specifically lines 34-44 states, inter alia, “measure the distribution of phase errors... Irradiate each arrayed waveguide with laser light to ... compensate for the phase error.” The phase error causes dispersion within the waveguide and the compensation of phase error compensates dispersion);

wherein the refractive index of the cores is adjusted within a grating area of the arrayed waveguide grating by using laser energy (column 14 lines 34-44).

Yamada also discloses an arrayed waveguide grating thus optimized with the above methods.

On the other hand, Chen reference explicitly discloses a method of controlling the optical path length of a waveguide via ultra short laser pulses to within ten nanometers (column 1 lines 55-67: Chen explicitly discloses controlling the path lengths within 1 picometer precision, which is certainly less than ten nanometers). Such arrangement is considered advantageous and desirable in the art, because it allows for highly precise optical device capable of high bandwidth optical communications having very close channel separation. (see also, column 1 lines 11-53 for advantages). Thus, the overall operating efficiency is significantly increased by having the optical path length controlled to within nanometer scale.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Yamada method to control the optical path length to within ten nanometers. It would be desirable to have an efficient, high fidelity optical device.

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Claims 3, 5, 11, 13, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al (US 5,940,548) and Chen et al (US 6,356,681).

Yamada in view of Chen render all the recited limitations obvious, as discussed above, *except* they do not explicitly disclose: measuring of phase errors within nanometer resolution (claims 3, and 11); or the use of ultraviolet laser energy (claims 5, 13, and 17).

However, as discussed in the previous office action and maintained in the present office action, measuring of phase errors within nanometer is well known and common in the art. Nanometer resolution is considered advantageous and desirable in the art because it allows for accurate and precise adjustment of phase error, which is desirable in building reliable optical communications device. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Yamada device to have nanometer resolution phase error measurement.

Also, as discussed in the previous office action and maintained in the present office action, the use of ultraviolet laser in changing refractive indexes of optical waveguides is well known and common in the art. The use of ultraviolet laser is considered advantageous and desirable in the art because it provides a simple, reliable and low cost means of modifying refractive indexes of optical waveguides without having to impart structural changes to the waveguides. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Yamada device to use the ultraviolet laser.

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Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al (US 5,940,548) in view of Chen et al (US 6,356,681) as applied to claims above, and in further view of Dugan et al (US 2003/0035640 A1).

Yamada, in view of Chen, renders claimed limitations obvious as discussed above. However, it does not explicitly teach the use of a pulsed laser with number of pulses selected to yield a controlled adjustment of the optical path length.

On the other hand, Dugan reference explicitly teaches the use of ultraviolet pulsed laser with discrete laser pulses to modify the refractive index of an optical waveguide, thereby correcting path length errors in waveguides (paragraphs 0006, 0007, 0033, 0037). This arrangement is taught to be advantageous and desirable over the prior art because it allows for relatively easy and efficient way of altering the optical characteristics of a waveguide (such as optical path length) in a precise increments regardless of the physical shape and form of the optical waveguides (paragraph 0033), and allows for facilitated manufacturing process (paragraph 0006).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Yamada device to use ultraviolet laser pulses with number of pulses to yield a controlled adjustment of the optical path length.

Response to Arguments

Applicant's arguments filed 7/20/2005 have been fully considered but they are not persuasive.

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Rejection over Yamada in view of Chen

Starting on the bottom of page 6, it is argued that there was no prima facie case of obviousness of the claimed invention, because “the Examiner has not provided any suggestion or motivation to combine the teachings of Yamada and Chen.”

The examiner respectfully submits that the Final Office Action mailed 5/5/2005 clearly outlined why one of ordinary skill in the art would be motivated to modify the device of Yamada to incorporate features discussed in Chen reference (see Claim Rejection- 35 USC 103 of Final Office Action mailed 5/5/2005). The examiner further submits that the motivation provided therein was expressly discussed in column 1 lines 11-53 of the Chen reference AND such knowledge would be generally available to one of ordinary skill in the art regardless.

Further, applicants argue physical heating in Chen would not be applicable to device of Yamada (second paragraph, page 8 of applicants’ response). The examiner respectfully submits that the Final Office Action refers to Chen’s embodiment wherein the *refractive index* of the waveguide is altered (second embodiment), rather than the embodiment where the physical length is changed (first embodiment). Thus, this argument is deemed moot

Regarding the second embodiment of Chen reference, applicants argue that Yamada does not disclose the use of dopant, and therefore there is no motivation to substitute Chen’s method (third paragraph, page 8). The examiner respectfully submits that even if Yamada may not explicitly disclose the use of a dopant, Yamada explicitly teaches a step of “irradiat[ing] each array waveguide with laser light to change the refractive index... and compensate for the phase error” (column 14 lines 42-44). Chen’s disclosure teaches a method of changing the refractive index of an optical waveguide by using dopants and irradiating to effectuate the refractive index

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change *in the core* (column 1 lines 63-67). Since the goal of both methods are to effectively change the refractive index of the optical waveguide and correct for the path length error, AND since there is a clear motivation for one of ordinary skill in the art (as discussed above) to use the method of Chen, which inherently involves doping the waveguide, the claim rejection based on 35 USC 103 is valid.

Rejection over Yamada in view of Dugan

In view of the amendment, the ground of rejection has been changed. Therefore, applicants' arguments under this section are deemed moot.

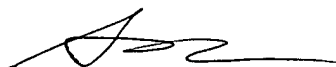
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571)272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sung H. Pak
Primary Patent Examiner
Art Unit 2874